

PATENT APPLICATION

Attorney Docket No. A02148US (98600.2)

TITLE OF THE INVENTION

"All Terrain Vehicle"

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CROSS-REFERENCE TO RELATED APPLICATIONS

Priority of U.S. Provisional Patent Application Serial
No. 60/400,496, filed 08/01/2002, incorporated herein by
10 reference, is hereby claimed.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR
DEVELOPMENT

Not applicable

REFERENCE TO A "MICROFICHE APPENDIX"

15 Not applicable

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to all terrain vehicles.
The present invention more particularly relates to an
20 improved all terrain vehicle that can automatically
eliminate water that might accumulate in the air filter
housing or transmission housing when the vehicle is used in
inundated areas.

2. General Background of the Invention

25 All terrain vehicles are used in many different types
of terrain. Some of these vehicles are subjected to use in
inundated areas such as rice fields, marshes, swamps,
streams, river bottoms and the like. When used in such an
environment, these vehicles (particularly those with
30 automatic transmissions) inadvertently intake water than can
find its way to the transmission housing and/or the air
filter housing. In such a situation, the vehicle can become
dangerous to operate and/or operable.

BRIEF SUMMARY OF THE INVENTION

35 The present invention solves these prior art problems

and shortcomings by providing an all terrain vehicle that has an improved transmission housing and air intake housing arrangement that automatically drains any water that is inadvertently ingested.

5 In the preferred embodiment, the transmission housing and/or the air intake housing are provided with a valve that automatically discharges any water that might be inadvertently ingested, and while in use.

10 The present invention is directed to an improved all terrain vehicle that has a chassis, front and rear wheels, an engine mounted in between the front and rear wheels, a seat to be occupied by a driver during use, and handlebars for enabling the user to steer the two front wheels.

15 The apparatus includes an inclined intake conduit that has a forward air intake opening and a housing air intake that communicates air from the forward air inlet to the transmission housing for cooling purposes. Air is discharged from the transmission housing via an air discharge passageway. Both the forward air intake
20 passageway and the rear air discharge passageways that communicate with the transmission housing are preferably inclined. The intake opening and discharge opening are each at the highest possible location to lessen the chance that they will make contact with a body of water such as a
25 stream, pond, lake, flooded field, marsh, swamp or with splashing water.

BRIEF DESCRIPTION OF THE DRAWINGS

30 For a further understanding of the nature, objects, and advantages of the present invention, reference should be had to the following detailed description, read in conjunction with the following drawings, wherein like reference numerals denote like elements and wherein:

35 Figure 1 is a partially cut away elevation view of the preferred embodiment of the apparatus of the present invention;

Figure 2 is a partially cut away fragmentary view of the preferred embodiment of the apparatus of the present invention;

5 Figure 3 is a fragmentary perspective view of the preferred embodiment of the apparatus of the present invention;

Figures 4A and 4B are sectional fragmentary views illustrating the valve portion of the preferred embodiment of the apparatus of the present invention; and

10 Figure 5 is a partial sectional elevation view of the preferred embodiment of the apparatus of the present invention illustrating the valve and its connection to the transmission housing, and illustrating the air intake passageway and air discharge passageway that supply air for cooling purposes to the transmission housing.

15 DETAILED DESCRIPTION OF THE INVENTION

Figures 1-4B show the preferred embodiment of the apparatus of the present invention, designated generally by the numeral 10 in Figure 1. All terrain vehicle 10 has a chassis 11 to which is mounted two front wheels 12 that are steerable wheels 12 and a pair of rear wheels 13. A seat 14 is positioned generally in between the front 12 and rear 13 wheels.

20 Handlebars 15 are mounted in front of seat 14 and enable an operator to steer the vehicle 10. An engine 16 is provided in between the front 12 and rear wheels 13 and generally below the seat 14. A transmission housing 17 is provided with a known automatic transmission that transfers power from engine 16 to rear wheels 13.

30 Transmission housing 17 has interior 18. The known transmission includes pulleys and a belt 21 or belts. The pulleys can include forward pulley 19 and a rear pulley 20 as shown in Figures 1 and 5. Belt 21 connects pulleys 19, 20.

35 Transmission housing 17 interior 18 receives cooling

air from lower air intake passageway 22. Air enters lower air intake passageway 22 through lower air intake opening 23 as indicated by arrow 24 in Figure 1. Air intake 24 communicates with housing 17 interior 18 at housing air inlet 25. Air enters transmission housing 17 interior 18 for purposes of cooling the transmission parts that are contained in housing interior 18. These parts are known in the art and can include pulleys 19, 20 and belt 21.

Air that is leaving transmission housing 17 interior 18 discharge via housing air exhaust 27 and air discharge passageway 28. Arrow 29 schematically illustrates the exhaust of air that has traveled from intake 23 to housing interior 18 and then to rear air discharge opening 28.

Another air intake at 35 is an upper air intake opening that provides air for the engine 16 carburetor. Air that enters intake 35 travels in the direction of arrow 37 via upper air intake passageway 36 to fitting 38. In Figures 1 and 2, fitting 38 communicates air to air filter element 31 inside air filter housing 30 where the air is filtered before it is discharged in the direction of arrow 33 into carburetor air flow channel 32. The carburetor air flow channel 32 is a bore of conduit 39 that connects air filter housing 30 with the carburetor of the engine 16.

The all terrain vehicle 10, fitted with the improvements disclosed herein, can be a commercially available all terrain vehicle that has an automatic transmission such as the Yamaha® Grizzly or Kodiak models, as examples. Generally speaking, these models have been available in the time frame of 1999 - 2002.

Yamaha® Grizzly and Yamaha® Kodiak models having automatic transmissions (as well as other all terrain vehicles that have automatic transmissions) have suffered from a water intake problem when they are used in inundated areas. This problem can affect users that traverse streams, lakes, ponds, rice fields and the like. When the vehicle

enters a rice field having a water level W, water in the form of drops 58 or other splashed water can enter either or both of the intakes 23, 35 and be ingested by the apparatus 10. In such a situation, the water drains
5 downwardly in the inclined passageways 22, 36 and can accumulate in either the interior 18 of transmission housing 17 or the interior of air cleaner housing 30.

Each of the housings 17, 31 is at an elevational position that is lower than or at the same level as the air
10 intakes 23, 35 respectively. For example, in Figure 1, air intake opening 23 is well above the interior 18 of automatic transmission housing 17. Similarly, the air intake 35 is preferably at an elevation above all or part of air filter housing 30.

15 In order to automatically and/or continuously remove water from either housing 17, 18 during use, a valve structure 40 or 46 can be employed. This valve is preferably a one way valve, check valve, flapper valve or like valve that removes water from the housing 17 interior
20 18 during use, i.e. while the user is riding upon or using the vehicle 10. Valve 40 that is attached to automatic transmission housing 17 is shown in figure 5. Valve structure 40 includes an upper section 41, lower section 42, and is threadably attached to an internally threaded
25 opening 44 of housing 17. Upper section 41 of valve structure 40 provides external threads 43 that engage the internally threaded opening 44.

The lower valve structure 42 is preferably a rubber or polymeric flapper valve that is similar to the construction
30 of valve 46 shown in Figures 3, 4A and 4B. The valves 40 and 46 each readily drain any water that collects above opening 44 or above opening 45 in Figure 3. Water simply drains through the valve structure 40 or 46 via gravity. However, each valve 40 or 46 is a one way valve or check
35 valve that disallows entry of water to the housing 40 or 46

via the valve 40 or 46. The lower valve element 42 and the valve member 46 can be of a rubber or polymeric construction and include, for example, a pair of opposed flat sections 53, 54 with a slotted opening 55 there
5 between that opens when water accumulates above the flat sections 53, 54. Water thus empties via slotted opening 55 in the direction of arrow 47, as shown in Figures 2 and 4B.

At air cleaner housing 30, opening 45 communicates with drain fitting 48 having annular shoulder 49. Valve 46
10 has an annular groove 51 that receives hose clamp 50. Valve 46 is shown in Figures 4A and 4B attached to fitting 48. Hose clamp 50 attaches to annular groove 51 of valve 46 at a position above annular shoulder 49 of fitting 48.

Similarly, the lower valve section 42 has a structure
15 as shown in Figure 4B that continuously drains any water that accumulates in housing 17 above internally threaded opening 44. In Figure 5, an externally threaded upper section 41 is provided for threading attachment to opening 44. In Figure 2, a hose clamp 50 is provided for attaching
20 valve 46 to an unthreaded, generally cylindrically shaped fitting 48.

PARTS LIST

The following is a list of suitable parts and materials for the various elements of the preferred
25 embodiment of the present invention.

	PART NO.	DESCRIPTION
	10	all terrain vehicle
	11	chassis
	12	front wheels
30	13	rear wheels
	14	seat
	15	handlebars
	16	engine
	17	transmission housing
35	18	interior

	19	pulley
	20	pulley
	21	belt
	22	lower air intake passageway
5	23	lower air intake opening
	24	arrow
	25	housing air inlet
	26	housing air exhaust
	27	air discharge passageway
10	28	rear air discharge opening
	29	arrow
	30	air filter housing
	31	air filter element
	32	carburetor air flow channel
15	33	arrow
	34	housing cover
	35	upper air intake opening
	36	upper air intake passageway
	37	arrow
20	38	fitting
	39	conduit
	40	valve
	41	upper section
	42	lower section
25	43	external threads
	44	internally threaded opening
	45	opening
	46	valve
	47	arrow
30	48	fitting
	49	annular shoulder
	50	hose clamp
	51	annular groove
	52	flexible section
35	53	flat section

	54	flat section
	55	slotted opening
	56	
	57	water level
5	58	water drops

The foregoing embodiments are presented by way of example only; the scope of the present invention is to be limited only by the following claims.